



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,175	01/20/2004	Kohei Yamada	2635-198	6669
23117	7590	10/10/2007		
NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			EXAMINER VATHYAM, SUREKHA	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 10/10/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/759,175

Applicant(s)

YAMADA ET AL.

Examiner

Surekha Vathyam

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 July 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings were received on 30 July 2007. These drawings are acceptable.

### ***Specification***

2. The disclosure is objected to because of the following informalities: In the amendments to the specification filed on 30 July 2007, in the replacement for paragraph beginning at page 16, line 12, a new error was introduced in the last line of the paragraph. Please change the symbol between "L1" and "0.95R" back to the symbol for "less than or equal to" instead of the square box that has been introduced.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 8 recites the limitation "the second wall portion" in line 4. There is insufficient antecedent basis for this limitation in the claim. The claim would

Art Unit: 1753

be interpreted to recite "a second wall portion" in line 2 instead of the currently amended "a second side wall".

5. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 10 depends from cancelled claim 2.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3 – 7, 9 – 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Makino et al. (US 6,346,179).

Regarding claim 1, Makino ('179) discloses a gas sensor (1) which works to measure a given component content in a gas (column 1, lines 6 – 8) and has a length with a top and a base end opposed to the top end (see figs. 1a and 1b), comprising: a cylindrical housing (18); a sensing element (2) disposed in said housing, said sensing element having a length which includes a top portion (D) facing the top end of the gas sensor, sensitive to the gas and a base portion facing the base end of the gas sensor (column 7, lines 35 – 38); and a cylindrical cover assembly (6) installed on said housing

Art Unit: 1753

to cover the top portion of said sensing element, said cover assembly having a length (L2) with a top end facing the top end of the gas sensor and a base end facing the base end of the gas sensor (see fig. 1b), said cover assembly including a first cover (6b) and a second cover (6a) retained outside the first cover, the first and second covers having side walls, respectively (see figs. 3(a), 4(a), 6(a) and 6(b)), the side wall of the second cover having formed therein a plurality of gas holes (63) through which the gas flows inside or outside said cover assembly (column 8, lines 6 – 12), at least one of the gas holes partially facing the side wall of the first cover in a lateral direction perpendicular to a longitudinal direction of said cover assembly, the at least one of the gas holes (63, 63a) having a first portion of a perimeter closest to the top end of said cover assembly and a second portion of the perimeter closest to the base end of said cover assembly (see figs. 6(a) and 6(b)), the first cover having a top end which faces the top end of said cover assembly and is located within a range defined between the first and second portions of the perimeter of the at least one of the gas holes in the longitudinal direction of said cover assembly (see figs. 6(a) and 6(b) and column 7, lines 54 – 62), wherein the side wall of the first cover has formed therein a plurality of gas holes (60, 61) through which the gas flows inside or outside the first cover (column 8, lines 28 – 44), all side wall gas holes of the first cover being located closer to the base end of said cover assembly than all gas holes of the second cover (see figs. 6(a) and 6(b)).

Regarding claim 3, Makino ('179) discloses the gas sensor wherein the first cover has a top end facing the top end of said cover assembly and a base end facing the base end of said cover assembly (see fig. 1(b) column 7, lines 58 – 62), and wherein a

Art Unit: 1753

distance L1 between the first portion of the perimeter of the at least one of the gas holes (63, 63a, 63b) of the second cover and the top end of the first cover and a diameter R ( $D_6$ ) of the at least one of the gas holes (column 10, lines 18 – 21) between the first and second portions of the perimeter thereof meets a condition of  $L1 \leq 0.95R$  (see figs. 6(a) and 6(b)).

Regarding claim 4, Makino ('179) discloses the gas sensor wherein the second cover has a top end (6f) defining the top end of said cover assembly (see fig. 1(b) and column 8, lines 13 – 15) and a base end defining the base end of said cover assembly, and wherein a distance L2 ( $L_4$ ) between the top end of the first cover and the top end of the second cover meets a relation of  $0.5 \text{ mm} \leq L2 \leq 10 \text{ mm}$  (column 9, lines 45 – 47).

Regarding claim 5, Makino ('179) discloses the gas sensor wherein the gas holes (63, 63a, 63b) formed in the side wall of the second cover partially face the side wall of the first cover in the lateral direction of said cover assembly (see figs. 6(a) and 6(b)).

Regarding claim 6, Makino ('179) discloses the gas sensor wherein the first cover has a gas hole (60, 61) formed in the side wall thereof, and wherein an outer diameter D1 ( $D_3$ ,  $D_4$  or  $D_5$ ) of the first cover at the top end thereof and an outer diameter D2 ( $D_7$ ) at a portion of a perimeter of the gas hole of the first cover closest to the top end of the first cover meet a relation of  $D1 < D2$  ( $D_3$ ,  $D_4$  or  $D_5 < D_7$ ) (see fig. 4(a) and column 10, lines 9 – 31).

Regarding claim 7, Makino ('179) discloses the gas sensor wherein the side wall of the first cover has a wall portion (6t) tapering off to the top end of the first cover

between the portion of the perimeter of the gas hole (61) closest to the top end of the first cover and the top end of the first cover (see figs. 6(a) and 6(b)).

Regarding claim 9, Makino ('179) discloses the gas sensor wherein the first cover has a gas hole (60, 61) formed in the side wall thereof, and wherein the side walls of the first and second covers have portions continuing to the base ends thereof which are in contact with each other (see figs. 6(a) and 6(b)), a distance  $L_3$  ( $L_7$ ) between a portion of the gas hole (60) of the first cover closest to the base end of the first cover and a portion of a contact between the side walls of the first and second covers closest to the top end of the first cover being less than or equal to 5 mm (column 9, lines 62 – 64 and column 9, lines 43 – 44).

Regarding claim 10, Makino ('179) discloses said sensing element (2) includes at least one solid electrolyte body (21) and a pair of electrodes (25, 26) disposed on the solid electrolyte body (see fig. 2), and wherein one of the electrodes (25) closer to the base end of the gas sensor has a portion closest to the base end of the gas sensor (see fig. 3(a), at least one of the gas holes (63) of the first and second covers disposed closest to the base end of the gas sensor having a first portion of a perimeter thereof closest to the top end of the gas sensor (see fig. 3(a)), the first portion being located closer to the top end of the gas sensor than a base end of the electrode of said pair that is closest to the base end of the gas sensor (see fig. 3(a)).

Regarding claim 11, Makino ('179) discloses the gas sensor wherein each of the first and second covers has an end wall defining the top end of said cover assembly, the

end wall of each of the first and second covers having a gas hole (62, 64) formed therein (see figs. 6(a) and 6(b)).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

Art Unit: 1753

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Makino et al. (US 6,346,179).

Makino ('179) discloses the gas sensor as discussed above with regards to claim 6. Regarding claim 8, Makino ('179) discloses the side wall of the first cover has a first wall portion and a second wall portion (6t) located closer to the top end of the first cover (see figs. 6(a) and 6(b)). The embodiments of figs. 6(a) and 6(b) do not explicitly disclose the first wall portion tapering off toward the top end of the first cover, the second wall portion extending straight to the top end of the first cover and having a diameter that is uniform over a length thereof. However Makino ('179) discloses an alternate embodiment in fig. 7(c) wherein the side wall of the first cover has a first wall portion (6t) and a second wall portion (6v) located closer to the top end of the first cover than the first wall portion, the first wall portion (6t) tapering off toward the top end of the first cover, the second wall portion (6v) extending straight to the top end of the first cover and having a diameter that is uniform over a length thereof (see fig. 7(c)).

It would have been obvious to one of ordinary skill in the art to have modified the geometry of the first cover side wall in the embodiments in figs. 6(a) and 6(b) to that shown in the embodiment of fig. 7(c) of Makino ('179) to optimize air flow (column 11, lines 16 – 34 and column 12, lines 40 – 44).

12. Claims 1, 3 – 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al. (US 6,348,141).

Regarding claim 1, Kato ('141) discloses a gas sensor (column 1, lines 5 – 8) which works to measure a given component content in a gas and has a length with a top and a base end opposed to the top end, comprising: a cylindrical housing (column 1, lines 30 – 37); a sensing element (12) disposed in said housing, said sensing element having a length which includes a top portion facing the top end of the gas sensor (see fig. 11), sensitive to the gas and a base portion facing the base end of the gas sensor; and a cylindrical cover assembly (200A) installed on said housing to cover the top portion of said sensing element (column 12, lines 15 – 22), said cover assembly having a length with a top end facing the top end of the gas sensor and a base end facing the base end of the gas sensor (see fig. 11), said cover assembly including a first cover (100) and a second cover (102) retained outside the first cover, the first and second covers having side walls (see fig. 11), respectively, the side wall of the second cover having formed therein a plurality of gas holes (110) through which the gas flows inside or outside said cover assembly (column 12, lines 28 – 33), at least one of the gas holes partially facing the side wall of the first cover in a lateral direction perpendicular to a longitudinal direction of said cover assembly (see fig. 11), the at least one of the gas holes having a first portion of a perimeter closest to the top end of said cover assembly and a second portion of the perimeter closest to the base end of said cover assembly, the first cover having a top end which faces the top end of said cover assembly and is

located within a range defined between the first and second portions of the perimeter of the at least one of the gas holes in the longitudinal direction of said cover assembly (see fig. 11). Kato ('141) also discloses in Fig. 11, the side wall of the first cover has formed therein a plurality of gas holes (106) through which the gas flows inside or outside the first cover (column 12, lines 22 – 27). Relevant to claim 1, in the embodiment of fig. 11, only some and not all side wall gas holes of the first cover are located closer to the base end of said cover assembly than all gas holes of the second cover. However, Kato ('141) discloses other embodiments shown in figs. 1 – 6, 7, 9 and 10, wherein all side wall gas holes (106) of the first cover are located closer to the base end of said cover assembly than all gas holes of the second cover.

It would have been obvious to one of ordinary skill in the art to have made all and not just some of the side wall holes of the first cover be located closer to the base end of said cover assembly than all the gas holes of the second cover as depicted in figs. 1, 5, 6, 7, 9 and 10 of Kato ('141) in the gas sensor depicted in fig. 11 of Kato ('141) because Kato ('141) discloses several embodiments for the cover assembly and specifically explains in relation to the embodiment in fig. 1 that the relative positioning of the side wall holes of the inner and outer covers prevents the gas sensing element from being invaded by water (column 14, lines 22 – 30).

Regarding claim 3, Kato ('141) discloses the gas sensor wherein the first cover has a top end facing the top end of said cover assembly and a base end facing the base end of said cover assembly (see fig. 11), and wherein a distance L1 between the first

Art Unit: 1753

portion of the perimeter of the at least one of the gas holes of the second cover and the top end of the first cover and a diameter  $R$  of the at least one of the gas holes between the first and second portions of the perimeter thereof meets a condition of  $L1 \leq 0.95R$  (see fig. 11).

Regarding claim 4, Kato ('141) discloses the gas sensor wherein the second cover (102) has a top end defining the top end of said cover assembly and a base end defining the base end of said cover assembly, and wherein a distance  $L2$  between the top end of the first cover (100) and the top end of the second cover meets a relation of  $0.5 \text{ mm} \leq L2 \leq 10 \text{ mm}$  (column 14, lines 7 – 9).

Regarding claim 5, Kato ('141) discloses the gas sensor wherein the gas holes formed in the side wall of the second cover partially face the side wall of the first cover in the lateral direction of said cover assembly (see fig. 11).

Regarding claim 6, Kato ('141) discloses the gas sensor wherein the first cover has a gas hole formed in the side wall thereof, and wherein an outer diameter  $D1$  of the first cover at the top end thereof and an outer diameter  $D2$  at a portion of a perimeter of the gas hole of the first cover closest to the top end of the first cover meet a relation of  $D1 < D2$  (see fig. 11).

Regarding claim 7, Kato ('141) discloses the gas sensor wherein the side wall of the first cover has a wall portion tapering off to the top end of the first cover between the portion of the perimeter of the gas hole closest to the top end of the first cover and the top end of the first cover (see fig. 11).

Regarding claim 8, Kato ('141) does not explicitly disclose in the embodiment of fig. 11, the side wall of the first cover having the geometry as recited in the claim. However, Kato ('141) discloses another embodiment shown in fig. 7 wherein the side wall of the first cover has a first wall portion and a second side wall located closer to the top end of the first cover than the first wall portion, the first wall portion tapering off toward the top end of the first cover, the second wall portion extending straight to the top end of the first cover and having a diameter that is uniform over a length thereof.

It would have been obvious to one of ordinary skill in the art to modify the gas sensor of Kato ('141) having the cover assembly depicted in fig. 11, to have the sidewall geometry of fig. 7 for the inner cover because Kato ('141) discloses several embodiments for the cover assembly and in particular the embodiment in fig. 7 has the benefit of effectively avoiding the adhesion of condensed water on engine start-up and gives a quick response performance (column 16, lines 16 – 21).

Regarding claim 9, Kato ('141) discloses the gas sensor wherein the first cover has a gas hole (106) formed in the side wall thereof, and wherein the side walls of the first and second covers have portions continuing to the base ends thereof which are in contact with each other (see fig. 11), a distance L3 between a portion of the gas hole of the first cover closest to the base end of the first cover and a portion of a contact between the side walls of the first and second covers closest to the top end of the first cover being less than or equal to 5 mm (see fig. 11 and column 13, lines 40 – 42).

Regarding claim 10, Kato ('141) discloses the gas sensor wherein said sensing element (12) includes at least one solid electrolyte body (14d, 14f) and a pair of

electrodes (40, 42, 60, 70, 48) disposed on the solid electrolyte body (see fig. 3), and wherein one of the electrodes closer to the base end of the gas sensor has a portion closest to the base end of the gas sensor (column 12, lines 15 – 22), at least one of the gas holes (110) of the first and second covers disposed closest to the base end of the gas sensor having a first portion of a perimeter thereof closest to the top end of the gas sensor (see fig. 11), the first portion being located closer to the top end of the gas sensor than a base end of the electrode of said pair that is closest to the base end of the gas sensor (see fig. 11).

Regarding claim 11, Kato ('141) discloses the gas sensor wherein each of the first and second covers has an end wall defining the top end of said cover assembly (see fig. 11). Kato ('141) does not explicitly disclose in the embodiment of fig. 11, the end wall of each of the first and second covers having a gas hole formed therein. However, in the embodiment in figs. 1, 5, 6, 7 and 9, Kato ('141) discloses the end wall of the first cover having a gas hole (108) formed therein and in the embodiment in fig. 12, Kato ('141) discloses the end wall of the second cover having a gas hole (140) formed therein.

It would have been obvious to one of ordinary skill in the art to have included a gas hole in the end wall of each of the first and second covers of the embodiment in fig. 11 of Kato ('141) as taught by the embodiments in figs. 1, 5, 6, 7, 9 and 12 of Kato ('141) because as Kato ('141) explains the gas hole in the end wall of the covers functions as a gas discharge hole by virtue of the negative pressure produced in it's vicinity while the gas hole formed in the side wall of the covers functions as a gas

introduction hole thereby the gas holes in the side wall and end wall together provide a quick flow passage for a measurement gas which enables a decrease in diffusion rate-limit and makes it possible to obtain quick response performance (column 14, lines 31 – 46).

### ***Response to Arguments***

13. Applicant's arguments with respect to claims 1, 3 – 10 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 1753


the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Surekha Vathyam whose telephone number is 571-272-2682. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SV/  
3 October 2007

  
NAM NGUYEN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700